Since we last spoke...
New Ideas

• High Risk Clinic ("CareSync Clinic")
  – Not specific to cardiac patients
    • Key component of a broader push within the group to provide a higher level of outpatient care
    • Goal is to avoid preventable ER visits and hospitalizations
  – Will be physically located within our Urgent Care Centers
  – Staffing TBD
  – For CHF patients we will provide outpatient diuresis
    • Hospitalized patients that still need another dose of IV lasix, but are stable for discharge
      – Goal is to decrease length of stay for stable patients
        » Particularly in patients who are stable for discharge over the weekend
    • Outpatients who are developing worsening heart failure
      – Attempt to avoid hospitalizations
  – Currently working on protocols for diuretic dosing, length of monitoring, and follow-up
New Ideas

• Risk Stratification
  – Adopted a risk stratification score to help determine where to apply resources
    • Telehealth, care management, more frequent visits
  – Care managers will maintain close contact with “high risk” patients

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**Risk stratification for death and all-cause hospitalization in heart failure clinic outpatients**

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\textsuperscript{b}Ann Arbor Veterans’ Affairs Medical Center, Ann Arbor, MI
\textsuperscript{c}Division of General Medicine, Department of Internal Medicine, University of Michigan, Ann Arbor, MI

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**Table III. Integer HFPSI score**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Point score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting score</td>
<td>0</td>
</tr>
<tr>
<td><strong>BUN (mg/dl)</strong></td>
<td></td>
</tr>
<tr>
<td>21–34</td>
<td>+1</td>
</tr>
<tr>
<td>35–50</td>
<td>+2</td>
</tr>
<tr>
<td>&gt;50</td>
<td>+3</td>
</tr>
<tr>
<td><strong>BNP (pg/mL)</strong></td>
<td></td>
</tr>
<tr>
<td>&gt;55 (log BNP &gt;4)</td>
<td>+2</td>
</tr>
<tr>
<td>&gt;148 (log BNP &gt;5)</td>
<td>+3</td>
</tr>
<tr>
<td>&gt;403 (log BNP &gt;6)</td>
<td>+5</td>
</tr>
<tr>
<td><strong>Diabetes (any type)</strong></td>
<td></td>
</tr>
<tr>
<td>Atrophic fibillation/ventricle</td>
<td>+1</td>
</tr>
<tr>
<td>NYHA class III</td>
<td>+1</td>
</tr>
<tr>
<td>NYHA class IV</td>
<td>+2</td>
</tr>
<tr>
<td><strong>Prior hospitalizations</strong></td>
<td></td>
</tr>
<tr>
<td>Within 1 mo</td>
<td>+5</td>
</tr>
<tr>
<td>Within 2–6 mo</td>
<td>+2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk group</th>
<th>Total points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>0–3</td>
</tr>
<tr>
<td>Group 2</td>
<td>4–6</td>
</tr>
<tr>
<td>Group 3</td>
<td>7–9</td>
</tr>
<tr>
<td>Group 4</td>
<td>≥10</td>
</tr>
</tbody>
</table>
New Ideas

• Involve palliative care in the management of the sickest CHF patients
  – Offered to CHF patients who may need invasive procedures
    • Device Therapy
    • TAVR
  – Expanding palliative care services within the SMG network
  – Collect data on # of palliative care referrals

• Offer support group for patients and family members
Outcomes

HF Best Practice Collaborative Data

<table>
<thead>
<tr>
<th></th>
<th>Use of ACE/ARB by HF patients</th>
<th>Use of Beta Blockers by HF patients</th>
<th>30-day Re-admission Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014 (Baseline)</td>
<td>67%</td>
<td>58%</td>
<td>3.2%</td>
</tr>
<tr>
<td>2015 Q4</td>
<td>66%</td>
<td>74%</td>
<td>6.1%</td>
</tr>
<tr>
<td>2016 Q1</td>
<td>52%</td>
<td>62%</td>
<td>6.3%</td>
</tr>
</tbody>
</table>

2016 Q1 Details

<table>
<thead>
<tr>
<th></th>
<th>Numerator</th>
<th>Denominator</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,259</td>
<td>2,425</td>
<td>52%</td>
</tr>
<tr>
<td></td>
<td>1,499</td>
<td>2,425</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>159</td>
<td>6%</td>
</tr>
</tbody>
</table>

• Decrease in utilization of appropriate medical therapy in 2016 Q1 is likely due to more accurate data collection rather than a true decrease in treatment

• 30-day readmit baseline data was only based on 1 hospital. Current data is from 3 hospitals
Celebrating Accomplishments

• Patient registry
  – Data collected on 2425 systolic CHF patients
  – Data accuracy continues to improve
  – Will attempt to further risk stratify
    • Goal to direct resources to the sickest patients
Celebrating Accomplishments

- Established a practice wide treatment algorithm for heart failure patients
  - Based on ACC/AHA guidelines
    - Educate providers to ensure CHF diagnosis is given to the appropriate patients
    - Integrate and standardize medical treatment across subspecialties
    - Standardize care between in-patients and out-patients
    - Delineate appropriate medical therapy
      - Use only indicated medications
      - Identify target doses
      - Remind providers about potential side effects
      - List costs for individual therapy options with goal of using generic, low cost treatment options when available
        » For example - Spironolactone ($10/month) vs Eplerone ($80/month)
  - Goal to increase appropriate utilization of devices and cardiac rehab
# Treatment and Management

## SELECTED HEART FAILURE MEDICATIONS

### FIRST LINE

<table>
<thead>
<tr>
<th>Drug</th>
<th>Starting Dose for HF</th>
<th>Target Dose for HF</th>
<th>~Cost (30 days)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACEI's</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lisinopril</td>
<td>2.5 to 5 mg once daily</td>
<td>20 to 40 mg once daily</td>
<td>$5</td>
<td>Use for patients with left ventricular dysfunction unless contraindicated. May increase dose after one to two weeks. Encourage patients with mild cough to remain on ACEI. If patient cannot tolerate an ACEI due to cough, substitute ARB. Check K+, SCR, and BP within one week of initiation or dosage increase in the elderly, and within one to two weeks of initiation or dose increase in others. Recheck at regular intervals. SCR increases up to 30% that stabilize within 2-3 weeks are acceptable. Discontinue if SCR increases more than 1 mg/dL, or potassium is &gt;5.5 mEq/mL. If stable, recheck SCR and K+ once or twice yearly, or if patient condition or meds change.</td>
</tr>
<tr>
<td>Enalapril</td>
<td>2.5 mg twice daily</td>
<td>10 mg twice daily</td>
<td>$10</td>
<td></td>
</tr>
<tr>
<td>Ramipril</td>
<td>1.25 to 2.5 mg once daily</td>
<td>5 mg twice daily or 10 mg once daily</td>
<td>$10</td>
<td></td>
</tr>
<tr>
<td>Beta Blockers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carvedilol</td>
<td>3.125 mg twice daily</td>
<td>25 mg twice daily</td>
<td>$10</td>
<td>Can start beta-blocker before ACEI is optimized.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Monitor vitals closely during titration. Do not increase dose until any adverse effects have resolved.</td>
</tr>
<tr>
<td>Metoprolol</td>
<td>12.5 to 25 mg once daily</td>
<td>200 mg once daily</td>
<td>$15</td>
<td>If hypotension occurs, separate beta-blocker from other hypotensive agents (e.g., ACEI), or decrease diuretic dose. For symptoms of severe fatigue, consider other causes such as overdiuresis, sleep apnea, or depression. Continue beta-blocker even if it does not seem to improve heart failure symptoms.</td>
</tr>
<tr>
<td>Metoprolol</td>
<td>12.5 to 25 mg once daily</td>
<td>20 mg once daily</td>
<td>$10</td>
<td></td>
</tr>
<tr>
<td>Metoprolol</td>
<td>extended-release</td>
<td>10 mg once daily</td>
<td>$10</td>
<td></td>
</tr>
<tr>
<td>Bisoprolol</td>
<td>1.25 mg once daily</td>
<td>10 mg once daily</td>
<td>$10</td>
<td></td>
</tr>
<tr>
<td>Aldosterone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antagonists</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spironolactone</td>
<td>12.5 to 25 mg once daily</td>
<td>25 mg once or twice daily</td>
<td>$10</td>
<td>Use for patients with Class III to IV HF and LVEF 35% or less, unless contraindicated, to reduce morbidity and mortality. Use for post-MI patients with LVEF 40% or less with symptoms or a history of diabetes, unless contraindicated, to reduce morbidity and mortality. Do not start if baseline creatinine is over 2.5 mg/dL (221 umol/L) in men or over 2 mg/dL (176.8 umol/L) in women, or eGFR is 30 mL/min/1.73 m2 or lower, or potassium is &gt;5 mEq mmol/L or higher. Use as an add-on to ACEI or ARB plus beta-blocker. Discontinue or reduce dose of potassium supplements. Counsel patients to avoid NS/AIDs and high-potassium foods. Check potassium and renal function at regular intervals and when clinically indicated (e.g., ACEI or ARB initiation or dosage increase, renal function insult, etc.). Discontinue if hyperkalemia. Spironolactone causes more gynecomastia than Eplerenone.</td>
</tr>
<tr>
<td>Eplerenone</td>
<td>25 mg once daily (every other day if eGFR 30-49 mL/min/1.73 m2)</td>
<td>Titrate to 50 mg once daily within 4 weeks, as tolerated</td>
<td>$80</td>
<td>Use for patients with Class II to IV HF and LVEF 35% or less, unless contraindicated, to reduce morbidity and mortality. Use for post-MI patients with LVEF 40% or less with symptoms or a history of diabetes, unless contraindicated, to reduce morbidity and mortality. Do not start if baseline creatinine is over 2.5 mg/dL (221 umol/L) in men or over 2 mg/dL (176.8 umol/L) in women, or eGFR is 30 mL/min/1.73 m2 or lower, or potassium is 5 mEq mmol/L or higher. Use as an add-on to ACEI or ARB plus beta-blocker. Discontinue or reduce dose of potassium supplements. Counsel patients to avoid NS/AIDs and high-potassium foods. Check potassium and renal function at regular intervals and when clinically indicated (e.g., ACEI or ARB initiation or dosage increase, renal function insult, etc.). Discontinue if hyperkalemia. Spironolactone causes more gynecomastia than Eplerenone.</td>
</tr>
</tbody>
</table>
Celebrating Accomplishments

• Patient education and support
  – Patients discharged from the hospital will receive a “gift bag” (awaiting final approval)
    • Pill box
    • 8 oz. cup
    • Lunch bag
      – Patient can carry all their medication bottles in to his/her visit for reconciliation and education
  • Patient guide for living with CHF
    – We have improved upon our patient education guidebook to reflect changes in clinical practice
Improvement Interventions

• Patient registry and data collection
• CHF treatment algorithm
  – Individualized scorecards (by provider) on utilization of BB/ACE/ARB is always available to all providers through the EMR
• Patient education and support program
  – Goal to increase patient involvement and self-management
• Increased utilization of care managers
  – Increased contact with patients/families
Challenges?

• Provider education
  – Utilize guideline recommended therapy
    • Avoid use of BB’s/ACE/ARB’s without therapeutic indication for CHF
  – Appropriateness criteria for diagnostic testing
  – Expanding EP program to increase utilization of appropriate device therapy
  – Increase utilization of cardiac rehab
Challenges?

• Staffing high risk clinic
  – Likely will be staffed by hospitalists, Urgent Care providers, PA/APN, Clinical Pharmacist, and Urgent Care nursing. Actively looking to hire PA/APN/RN’s

• High Risk Clinic hours of operation
  – Goal to provide care to patients during “off hours”, specifically weekends
    • Staffing more difficult for off hours
Challenges?

- Transitions of care
  - Ensure that the plan of care is carried out uniformly throughout all physical locations of a patient's care including hospital, SNF, home, and/or urgent care
    - Provider communication through a unified EMR
    - Care management
    - Patient Education
Challenges?

• Data collection
  – CHF patient population
    • Ensure that we are accurately capturing all of our heart failure patients from all 50+ outpatient sites, 9 hospital and 20 SNF’s
  – Medication usage
    • Determine way to appropriately exclude patients who have true allergies or intolerance to BB or ARB’s

• Telehealth
  – Attempt to find an affordable telehealth provider for our geographic area
Next Steps

• We plan to open the 1st High Risk Clinic location this fall
  – To open 2-3 additional sites within the next year
    • Will test diuresis protocols and re-assess in a few months

• Risk stratify all of our CHF patients
  – Goal to identify who is “at risk” for clinical decompensation

• Incorporate Telehealth and continue to improve care coordination
Lessons Learned

• Patients with CHF are seen across all specialties
  – Standardized care improves outcomes
  – Collaboration is essential to seamless transitions between providers and sites of care

• Access is essential
  – Patients need to be seen before they decompensate
  – Patients need to be seen immediately when they are sick - hospitalization may still be avoidable
    • High risk clinic
Questions

• How are you risk stratifying patients?
  – Hospitalized patients are obviously at higher risk
  – Is there any accurate way to predict who might experience an index admission for CHF?

• What experience do other groups have with outpatient diuresis?
  – Does anyone have experience with early discharge in stable hospitalized patients with the goal of continuing IV diuresis as an outpatient?
  – How do you assess adequacy of IV diuresis in the outpatient setting?
    • Urine output?
    • Clinical symptoms?
    • Weight?